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In one specimen the posterior angle of the white dilatation representing the apical lunule is prolonged inwards, and slightly hooked.

It is found promiscuously with *C. tortuosa, punctulata*, and both varieties of *abdominalis*, on small sandy paths through meadows, near Hogarth's landing, and near Spring Cove. They were seen in July, August and September; in July *abdominalis* was abundant, and *hirtilabris* scarce; but later, these proportions were reversed.

The position of this species is in the group with *blanda*, *cuprascens*, etc., next to *gratiosa*.

Notes on the RHYSODIDÆ of the United States.

BY JOHN L. LECONTE, M. D.

On comparing specimens of *Rhysodes* and *Clinidium* from the Pacific States with those from the Atlantic district, I have recently observed some characters which induce me to regard them as specifically different. In pursuing my investigation, I have found certain sexual peculiarities which seem to have been overlooked, and which will probably render necessary a new study of the species heretofore described, and a more accurate definition of their characters.

These sexual differences are to be perceived in the anterior femora, and in the hind tibiæ; sometimes also in the middle tibiæ. I have endeavored to indicate the differences in the tibiæ in the adjoined wood cuts.

RHYSODES Dalman.

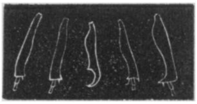
§.—Prothorax with three entire deep grooves; elytra striate, not costate; middle and hind tibiæ with one terminal spur.

1. R. exaratus *Serv.*, Enc. Méth. X., 308, 1825; (nec Dalman). Westwood, Zool. Journ. V., tab. 46, p. 1.

R. americanus Lap., Silbermann's Rev. Ent. IV., 58, 1836.

R. aratus Newm., Mag. Nat. Hist., 1838, II., 663; Germar. Zeitschr. II., 344.

Atlantic States, New York to Georgia and westward to Missouri. The prothorax is about one-half longer than wide, broadly rounded on the sides, more rounded near the tip; the furrows are very deep, and the two outer ones are dilated behind; the disc is convex on the sides, and the side margin is not visible from above. The elytral striæ are composed of approximate punctures, and the inner striæ are somewhat impressed.



♂.—The front thighs are armed with a very distinct tooth; the middle tibiæ are produced inwards at tip into a small cusp, and the terminal spur is slightly curved; the hind tibiæ are obliquely impressed on the inner face, and slightly dilated at tip, terminal spur small, straight.

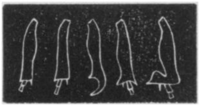
♀.—Front thighs not toothed; middle and hind tibiæ not dilated at tip.

I have excluded from the synonymy reference to the descriptions of European specimens which have been considered identical by Erichson, Chevrolat and other authorities, because the hind tibiæ are described by Erichson as being dilated in an almost hook-like form, which would indicate a greater resemblance to the next species.

Should they prove on comparison to be different, then it will be necessary for the European species to receive another name.

In case the name *exaratus* is considered as involved in too great confusion, in consequence of its use first by Dalman, and second by Serville for two different species, the name *americanus* will have priority over *aratus* which has been adopted by Gemminger and Chevrolat. I have preferred to retain *exaratus*, for although it was first applied by Dalman to another species, it appears that Fabricius had previously described the latter as *Cucuius sulcatus*.

2. R. hamatus.—Brown-black, shining, head rather obliquely narrowed behind the eyes, which are subtruncate behind, and lateral. Prothorax more than one-half longer than wide, with three very deep entire grooves; elevated spaces sparsely but distinctly punctured. Elytral striæ deeper than in the preceding, and more coarsely punctured. Length 5.5—7.5 mm.; .21—.30 inch.



♂.—Front thighs armed with a distinct tooth; apical cusp of middle tibiæ longer, acute; hind tibiæ broadly dilated, more deeply grooved on the inner side, with the terminal dilatation transverse, acute at the inner end; apical spur small.

♀.—Front thighs not toothed, middle and hind tibiæ simple.

California, Mr. Behrens and Dr. Horn. Narrower than the preceding, with the prothorax longer, less suddenly rounded in front, and somewhat less convex. The elevated spaces of the head and prothorax are sparsely punctured, and the elytral striæ are much deeper.

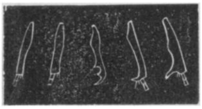
CLINIDIUM Kirby.

§.—Prothorax with entire dorsal line, two short deep basal impressions and double lateral line, elytra costate; middle and hind tibiæ with two terminal spurs.

1. C. sculptile Chevr., Am. Ent. Fr., 1873, 213.
Rhysodes sculptilis Newm., Mag. Nat. Hist., 1838, 666; Germ. Zeitschr. II., 348.
Rhysodes conjungens Germ. Zeitschr. II., 351.

Atlantic States, not rare. I have no hesitation in placing these two names as synonyms. The form of the prothorax is quite characteristic, oblong and not oval. The differences in the descriptions are easily accounted for by the fact that Newman described the elytra as having six grooves, but did not observe that the interval between the two outer ones was abbreviated in front, about one-fourth from the base. Germar on the contrary, regarding the costæ as more conspicuous than the intervening grooves, and omitting the sutural one, described the elytra as four-costate, with the outer costa, (corresponding with the region from the fourth to the sixth grooves of Newman), as double for a part of its course. For the purpose therefore of distinguishing more easily the present one from allied species I would offer the following diagnosis.

C. sculptile.—Head obliquely narrowed behind the eyes, base nearly truncate; eyes narrow, confined to the upper surface of the head. Prothorax nearly twice as long as wide, oblong, sides broadly rounded, base and apex also broadly rounded. Elytra with the costæ narrower than the deep intervening grooves, submarginal costa abbreviated in front at the anterior fourth or rarely the fifth, and usually confluent with the next one at the posterior fourth. Length 5.5—7.5 mm.; .21—.30 inch.

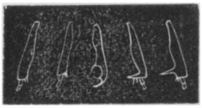


♂.—Front thighs distinctly toothed; front tibiæ rather suddenly dilated on the inner side, above the oblique groove; then sinuate; middle and hind tibiæ subsinuate on the inner side, produced inwards at tip into a sharp process. Prosternum with a broad stripe of velvety surface; ventral segments with spots of similar velvety lustre.

♀.—Front thighs not toothed; front tibiæ with only the usual arrangement of hooks and teeth; middle and hind tibiæ simple, with two small apical spurs.

Slight variations occur in the arrangement of the outer costæ of the elytra, which I have indicated in the diagnosis.

C. calcaratum.—Piceous, shining, elongate. Head obliquely narrowed behind the eyes, base subtruncate; eyes narrow, rather prominent, confined to the upper surface of the head. Prothorax nearly twice as long as wide, regularly elongate-oval, (not oblong); angles not apparent. Elytra with the costæ towards the base wider than the intervening furrows, submarginal costa and the next entirely confluent, with only a line of punctures indicating the separation. Length 7.5 mm.; .30 inch.



♂.—Front thighs not toothed; front tibiæ very feebly dilated on the inner side; middle and hind tibiæ with a large pointed apical process on the inner side, one-half the length of the tibiæ, apical spurs two, small straight; under surface without velvety spots.

♀.—Middle and hind tibiæ simple.

Two specimens from Vancouver Island, kindly given me by the Rev. A. Matthews, and one from Oregon by Mr. Ulke. The line of punctures on the outer costa of the elytra is deeper in one than in the other specimens, and indicates probably a variation in sculpture similar to that observed in *C. sculptile.*

In regard to the affinities of this family, that they are very complex has been recognized by all observers, but they have in the main agreed that the nearest relationship is with the Cucujidæ. The resemblance in several important structural details with the Carabidæ has been well pointed out, especially by Erichson, Ins. Deutschl., III, 298, and has been exaggerated by Crotch to such an extent, that he has placed Rhysodidæ as a family of the series ADEPHAGA.

There are, however, two lines of resemblance which I have failed to appreciate, though they have been indicated by excellent authority; these are with the Longicorn series in *Spondylis, Parandra*, etc.; and with Rhynchophora in certain Brenthidæ; it is true that the moniliform antennæ give a somewhat similar effect upon a first view, but there is so little similarity in the structure of the antennal surface, when minutely examined, that I can attach no importance to these supposed relationships.

The great master in classification, Latreille, who first proposed the genus *Rhysodes*, though he did not describe it, had a clearer recognition of the true affinities, when he associated it with *Cupes.* This approximation has not received the approval of other investigators, though I hope to demonstrate its correctness. The error which has heretofore obscured the perception of this affinity has been the incorrect placing of *Cupes* in the Serricorn series near Ptinidæ, with which it has only the remote relationship which I will point out below.

The extraordinary Australian genus *Omma* Newman, which the describer could not refer to any family at that time established, was recognized by him to have affinities with *Rhysodes* and *Cupes;* Erichson, followed by Lacordaire, referred it doubtfully to the Cucujidæ, but without having had the opportunity of examining it.

By the kindness of Mr. C. O. Waterhouse of the British Museum, I made a careful study of the type of *O. Stanleyi* preserved in that institution, and perceived very soon that it was closely allied to the *Cupes serrata* which I had described from Oregon; this observation is published in the Proc. Acad. Nat. Sc. Phila., 1873, p. 334, No. 195.

On a closer study of the four species of Cupesidæ found in the United States, I was obliged to separate *C. serrata* as a distinct genus *Priacma*, (Trans. Am. Ent. Soc., 1874, p. 87). This insect from its larger size and stouter form enables the important characters of the under surface to be studied with more ease than the other species.

Commencing then with the head, we find the following resemblances between the Cupesidæ and the Rhysodidæ:

1. In *Cupes* the eyes are almost smooth as in *Rhysodes*, though the very small lenses may be perceived under the epidermis; in *Priacma* the eyes are very finely granulate, but not smooth.
2. The lobed head of *Cupes* and the form especially of the hind part, and its junction with the prothorax are all suggestive of *Rhysodes*.
3. The prothoracic episterna are separate in *Cupes* and *Priacma*, though wider and more distinct in the latter.
4. The front coxæ are peculiarly small in both families.

It is also to be considered that in other characters these two families in question differ very greatly. The front coxal cavities are entirely enclosed in Rhysodidæ, while they are open behind and partially formed by the mesosternum in Cupesidæ. The middle coxæ are widely separated in the former, quadrate and contiguous in the latter. The hind coxæ are widely distant in Rhysodidæ; transverse, meeting on the median line, and extending to the side of the body in Cupesidæ. The basal ventral segment of the abdomen is visible at the sides and at the middle in Rhysodidæ, while it is entire and uninterrupted in Cupesidæ.

We thus see that the two families differ from all other Coleoptera in the characters which they possess in common; while in those by which they differ from each other, (many of which I have not mentioned), they agree with some other families or genera.

I think therefore that we are justified in regarding them as fragments, widely separated it is true, of a series of Coleoptera existing in former times, which was of an undifferentiated nature. This series was the original stem, or contained the ancestry, if I may use the realistic expressions of a modern school, of the several series which are comprised in the now existing great complex of normal Coleoptera, with the penultimate joint of the tarsi not anchylosed to the last joint. This complex consists of the series Adephaga, Clavicornia, Lamellicornia and Serricornia.

To attempt to intercalate such anomalous families as Rhysodidæ and Cupesidæ among the families which properly constitute the four series above mentioned, would be like finding a place for *Archæopteryx* in our classification of existing birds; *Ceratodus*, *Lepidosteus* and *Lepidosiren* among normal fishes, or Prof. Marsh's *Dinocerata* among recent mammals.

Looking at the two families from this point of view we see in Rhysodidæ a prothoracic structure, with feet that are suggestive of Carabidæ (*Clivina*, etc.); mouth rather peculiar, somewhat resembling *Catagenus*, but more related to *Omma* and *Priacma;* coxal arrangements similar to Cucujidæ; ventral segments combining Adephagous and Clavicornious characters.

In *Clinidium* moreover a form of eye confined to the upper surface of the head, which reminds us of Pseudomorphidæ.

In Cupesidæ we observe varied forms of antennæ; somewhat perfoliate, (*Omma*, *Priacma*); nearly filiform (*Cupes* sp.), or feebly serrate (*Cupes* sp.); gular sutures, (which are constant in great series of other Coleoptera) varying almost according to species; (Tr. Am. Ent. Soc., 1874, p 88). We also observe an arrangement of coxæ, and prothoracic side pieces unknown in the Serricorn series; the former resembling nothing else, the latter feebly indicative of the higher development of the Rhysodidæ and Carabidæ.

I have already suggested (Class. Coleopt. North Am. 279), similar views concerning the relations of the Spondylidæ, as a fragmentary survival of ancient forms, with our existing Cerambycidæ and other families. After a careful study of *Trictenotoma*, I am disposed to see in it also a survival of a series which in former ages represented the objects that we now know as Tenebrionidæ, with a strong resemblance to Prionidæ and Lucanidæ, and perhaps a slight tendency towards Cucujidæ.

Without dilating upon the subject at the present time, I may here observe that the immediate relations of *Trictenotoma* is with the Heteromerous series, in which it forms a family distinguished from Tenebrionidæ by the front coxæ being transverse and the coxal cavities angulated externally and open behind. The tarsi which are nearly similar to *Epitragus*, and the antennæ which resemble in type those of many Tenebrionidæ, though differing in modification from any tribe of that family, confirm this view. The sensitive surface is confined to the last three joints, the ninth and tenth being triangular, produced inwards, with the apical surface alone sensitive and velvety; the eleventh joint is oval, somewhat acute at tip, and covered entirely with sensitive surface. These sensitive surfaces are subdivided into two by a transverse line, well marked on the ninth and tenth, but feeble on the eleventh. The other joints are entirely without sensitive pores, but the eighth is thickened and elevated at the distal end; the first joint is as long as the three following and stouter. Now this restriction of sensitive surface to the distal end of the outer joints of the antennæ so far as I know occurs only in Tenebrionidæ and Lucanidæ, and the particular modification in form seen in *Trictenotoma* does not occur in either of those families. The mouth does not resemble at all that of the Cerambycidæ; in the latter the ligula is attached at the end of the mentum, and the intervening coriaceous piece is quite apparent; in *Trictenotoma* the mentum is larger, feebly emarginate, and the ligula is inserted behind it as is the case with *Lucanus*. The insertion of the antennæ, and the form of the side of the head in front of the eyes is also similar to the Lucanidæ. I therefore regard the affinities as strong in that direction; while the relation to the Prionidæ is one mostly of external resemblance. I may also observe, that the mandibles of *Trictenotoma* are quite different from those of *Prionus*, etc., in having on the under surface a fringe of long ciliæ as in *Leptura*. If therefore it has any affinity to Cerambycidæ, it is towards the whole family, and not specially to the Prionidæ subfamily.

The original and earliest ideal forms of Coleoptera, which combined the characters of the Isomerous and Heteromerous normal Coleoptera with the Rhynchophora, are unknown, and if they ever existed, have probably become extinct in the measureless lapse of ages since they flourished upon the earth.

The only indications we have of their possible existence, are the resemblances in form of certain Anthribidæ to Lamiidæ; the Rhynchophorous modifications of the prosternum in Nematidium and other Colydiidæ, as well as in Cossyphus; and the similar form of mentum in the higher Tenebrionidæ to that observed in some Otiorhynchidæ. The affinity of *Rhinomacer* with *Rhinosimus*, etc., may also be mentioned. I do not regard any of these relations as very strong; and many wide breaks have to be filled in our series before they can admit of satisfactory demonstration.